NATURAL RESOURCES CONSERVATION SERVICE
MARYLAND

CONSERVATION PRACTICE STANDARD

WATERING FACILITY

CODE 614
(Reported by No.)

DEFINITION

A device (tank, trough, or other watertight container) for providing animal access to water.

PURPOSES

To provide watering facilities for livestock and/or wildlife at selected locations in order to:

1. Protect and enhance vegetative cover through proper distribution of grazing;
2. Provide erosion control through better grasslands management; or
3. Protect streams, ponds and water supplies from contamination by exclusion of animals from those areas and providing alternative access to water.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where there is a need for new or improved watering facilities.

CONSIDERATIONS

Water Quantity

1. Effects on components of the water budget.
2. Effects on downstream flows or aquifers that affect other water uses or users.

Water Quality

1. Effects on erosion and movement of sediment, pathogens, and soluble and sediment attached substances carried by runoff.
2. Effects on the visual quality of onsite and downstream water resources.
3. Effects on wetlands and water-related wildlife habitats.
4. Locate as far away from streams and drainage ways as practical.
5. Provide fencing as necessary to exclude livestock from protected areas, and encourage use of facility.

CRITERIA

Design

Sanitary protection - If water for the watering facility is supplied from potable water sources the requirements of the state health department for materials and installation must be met. Pressurized systems shall be installed in accordance with local regulations. Permits may be required for the installation of these systems. Contact the Permits Division of the local county government for regulations and permit requirements.

Capacity - the trough or tank shall have adequate capacity to meet the water requirements of the livestock. This will include the storage volume necessary to carry over between periods of replenishment.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Daily consumption of water by livestock:

Beef Cattle -	12 gals/head/day
Dairy Cattle -	15 gals/head/day
Horses -	12 gals/head/day
Sheep -	2 gal/head/day
Swine (Hogs) -	4 gal/head/day
Goats -	1.5 gal/head/day
Poultry (Chickens) –	35 gals/1000 head/day

Where water supplies are dependable and livestock are checked daily, troughs with little water storage capacity may be used.

The site selected for the trough shall be well drained, or drainage shall be provided. Areas adjacent to the trough or tank where livestock travel shall be graveled, stoned, paved or otherwise treated to provide firm footing. The type of treatment shall be dependent on the type and number of animals and frequency of use. This treatment shall extend out a minimum of 6 feet around the trough or tank for cattle and horses and 4 feet for all other animals.

Outlets - automatic water level control and/or overflow facilities shall be provided. Overflow from the trough or tank shall be by means of an underground outlet. The overflow pipe shall meet one of the following:

1. Shall be one size larger than the inflow line.
2. Shall have capacity to pass the maximum inflow without overtopping the trough rim.

Protection - The overflow shall be protected from clogging by a submerged inlet or other approved method. The overflow shall be piped to a desirable and acceptable outlet. The outlet shall meet the same criteria as outlined in Practice Standard 606.

The trough, outlet and appurtenances shall be protected from freezing and ice damage. Freeze-proof troughs or electric heaters may be used.

Roof - When a roof is placed over the trough to provide shade, the roof shall be designed for appropriate snow and wind loads and shall be durable to withstand anticipated livestock and wildlife activities.

Vegetation

The Maryland conservation practice standard, Critical Area Planting, code 342 shall be used to determine the appropriate grass species to be established based on site conditions and use. Plants listed on the Maryland noxious weed list shall not be planted.

Materials

Watering Facility - all materials shall have a life expectancy that meets or exceeds the planned life of the installation. The trough or tank shall be constructed of reinforced concrete, steel, fiberglass, plastic or other equally durable material. All designs shall meet industry standards for the material being used.

Galvanized steel tanks shall have a minimum thickness of 20 gage. Plastic and fiberglass structures shall be made of ultraviolet resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight.

Concrete structures shall have a minimum thickness of 4 inches, be constructed from a concrete mix producing a minimum compressive strength of 3,000 psi at 28 days and have minimum steel reinforcement of 0.9 square inches per foot. When concrete structures have walls that are variable (tapered) in thickness the minimum average thickness of the walls shall be 4 inches.

Commercially produced facilities meeting the criteria above are acceptable.

Concrete culvert pipe used as a watering facility shall have a minimum thickness of 3 inches, shall be watertight and in good condition.

Gravel - Crushed rock or gravel shall be compliant with gradations and quality found in the State Highway Administration, Standard Specifications for Construction and Material, Section 901.

Pipes - supply pipelines shall meet the requirements of the Maryland conservation practice standard Pipeline, code 516.

All pipelines and appurtenances shall be connected to prevent leakage, be sturdy, and durable. Valves, pipes and other appurtenances shall be protected from damage from livestock.

SPECIFICATIONS

Plans and specifications for installing troughs and tanks shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. If the trough and/or tank are a component of a system that includes additional conservation practices, the information necessary to construct these additional practices will also be conveyed on the plans.

The foundation area shall be cleared of organic matter and all other unsuitable material. When backfill is required to establish planned grade lines the backfill shall be compacted by hand-operated compaction equipment.

The foundation area and the immediately surrounding area shall be smoothed and graded to permit free drainage of surface water.

All materials, placement, anchoring, proportioning and protection shall be as shown on the plans. Concrete shall be of a quality to produce a 28 day compressive strength of 3000 psi. If the supplier cannot show evidence that his mix will meet strength requirements he may use a mix with a maximum net water content of 6 gallons per bag (94#) of cement and a minimum cement content of 6 bags per cubic yard of concrete. Aggregates are to be proportioned to produce a workable mix.

All construction shall be performed in a professional manner and the job site shall have a neat appearance when finished.

OPERATION AND MAINTENANCE

An O & M plan specific to the type of installed trough or tank shall be provided to the landowner. The plan shall include, but be limited to, the following provisions:

1. Inspect collection and storage devices, valves, outlets and pipelines at least biannually. Make repairs as needed.

2. Check for and remove debris, algae, sludge or other materials, which may restrict the inflow or outflow system.

3. Prepare guidance for winter weather operation, such as cleaning and discontinuing use, or providing for frost-free use.

4. Protect from damage due to livestock and farm equipment. Maintain fences and other devices used for this purpose.

5. Check for leaks and repair immediately.

6. Check valves, automatic water level devices, and overflow pipes for proper operation.

7. Chemicals may be added to the system for control of algae when used in accordance with local rules and regulations

8. Maintain vegetative cover around the system. Mow at least yearly. Provide weed control as needed. Reseed, lime, and fertilize area as needed.

SUPPORTING DATA AND DOCUMENTATION

Field Data and Survey Notes

The following is a list of the minimum data needed:

1. System plan sketch.
2. Profile along centerline of proposed pipe from source to outlet.
3. Special control or field feature that must be considered in design.

Design Data

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see chapter 5 of the EFH, Part 650. The following is a list of the minimum required design data:

1. Plan view including all system components and construction specifications.
2. Profile of system included on the plans.
3. Determine slope of pipeline and difference in elevation between source or collection box inlet and tank overflow, record on plan.
4. Complete pipeline design using methods described in chapters 12, 14 or 15 from the EFH, Part 650, as applicable.
5. Select type and dimensions for tank and spring box (if used) included on the plans.
6. Show type and size of pipeline system on profile on the plans.
7. Show size and type of stabilization treatment around facility on the plans.
8. Job Class on plan.
9. Quantities Estimate.
10. Planting plan. This must meet the criteria, specifications, and documentation requirements of the Maryland conservation practice standard, Critical Area Planting, code 342.
11. Written Operation and Maintenance Plan

Construction Check Data/As-built

Record on survey note paper, SCS-ENG-28, or other appropriate engineering paper. Survey data will be plotted on plans in red. The following is a list of minimum data needed for As-builts:

1. Documentation of site visits on CPA-6. The documentation shall include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom.
2. Elevations of control features.
3. Dimensions of pipelines, spring box, collection system, trough and other components.
4. Statement on seeding and fencing.
5. Final quantities and documentation for quantity changes. Materials certification.
6. Sign and date checknotes and plans by someone with appropriate approval authority. Include statement that practice meets or exceeds plans and NRCS practice Standards.

REFERENCES

1. American Society for Testing and Materials, *ASTM Standards*, Philadelphia, Pennsylvania.
2. American Concrete Institute, *Building Code Requirement for Structural Concrete, ACI 318,* Farmington Hills, Michigan.
3. American Concrete Institute, *Building Code Requirement for Masonry Structures, ACI 530,* Farmington Hills, Michigan.
4. American Institute of Steel Construction, *Manual of Steel Construction.*
5. Maryland Department of Transportation, *Standard Specifications for Construction and Materials*, State Highway Administration, Baltimore, Maryland, October 1993.
6. USDA, Natural Resources Conservation Service, *Maryland Field Office Technical Guide, Section IV, Standards and Specifications.*
7. USDA, Natural Resources Conservation Service, *National Engineering Handbook, Part 650.*